

5        METHOD AND APPARATUS FOR DISTRIBUTING FRAGRANCE ON A  
              CLEANING SURFACE

10                    BACKGROUND OF THE INVENTION

10        Field of the Invention

              The present invention relates to a method and apparatus for  
distributing fragrance on a cleaning surface.

15        Background Information

              It is known to have cleaning machines such as carpet extractors  
that distribute cleaning solution composed of detergent mixed with water to wash  
the cleaning surfaces. Some extractors can also distribute cleaning solution  
composed of clean water to rinse the cleaning surface in addition to cleaning  
20        solution composed of detergent mixed with water. Often, a clean water supply  
tank and a detergent supply tank are used for distributing either type of cleaning  
solution. Some cleaning machines further have mixing valves to selectively  
control the ratio of detergent and clean water in the cleaning solution. It would  
be desirable to provide a cleaning machine that distributes a cleaning solution  
25        that has fragrance attributes to produce the desired smell.

              Hence, it is an object the present invention to provide a cleaning  
machine that distributes a cleaning solution with fragrance attributes.

SUMMARY OF THE INVENTION

30        The foregoing and other objects of the present invention will be  
readily apparent from the following description and the attached drawings. In

one aspect of the invention, a portable cleaning apparatus for cleaning a surface is provided and includes a housing for movement along the cleaning surface. A solution distribution system is mounted at least in part to the housing and includes a solution distributor operatively connected to the housing for  
5 distributing a cleaning solution onto the cleaning surface, a first solution tank for holding the cleaning solution, and a solid chemical containing a fragrance emitting substance provided in the first solution tank.

In another aspect of the invention, a portable cleaning apparatus for cleaning a surface is provided and includes a housing for movement along  
10 the cleaning surface. A solution distribution system is mounted at least in part to the housing and includes a solution distributor operatively connected to the housing for distributing a cleaning solution onto the cleaning surface, a first solution tank for holding the cleaning solution, and a body of a fragrance emitting substance combined with an effervescent substance provided in said first  
15 solution tank.

In another aspect of the invention, a method for applying a fragrance emitting substance to a cleaning surface is provided and includes the steps of placing a solid chemical composed of the fragrance emitting substance into a first solution tank in an extraction cleaning machine which  
20 includes the solution tank, placing a body of liquid in the solution tank to dissolve the solid chemical composed of fragrance emitting substance and emit the fragrance from the solid chemical, providing a distributor operatively connected to said extraction cleaning machine for distributing a liquid onto the cleaning surface in fluid communication with the first solution tank, and  
25 distributing the liquid containing the dissolved solid chemical onto the cleaning surface through the distributor as the extraction cleaning machine is moved

over the surface.

### BRIEF DESCRIPTION OF THE DRAWINGS

The invention will now be described, by way of example, with  
5 reference to the attached drawings, of which:

Figure 1 is a perspective view of a carpet extractor embodying the  
present invention;

Figure 2 is an exploded view of the base assembly of the carpet  
extractor illustrating the principal elements thereof;

10 Figure 3 is a schematic view of the fluid distribution system of the  
embodiment shown in FIG. 1; and

Figure 4 is a magnified view of a bristle from the brush assembly of  
the carpet extractor of FIG. 1.

### 15 DETAILED DESCRIPTION OF THE INVENTION

Referring to the drawings, FIG. 1 depicts a perspective view of an  
upright carpet extractor 60 according to one embodiment of the present  
invention. The upright carpet extractor 60 comprises an upright handle  
assembly 62 pivotally connected to the rear portion of the floor-engaging portion  
20 or base assembly 64 that moves and cleans along a surface 74 such as a  
carpet.

A supply tank assembly 76 is removably mounted to the handle  
portion 62 of the extractor 60 and includes a combination carrying handle and  
securement latch 78 pivotally connected thereto. A combined air/water  
25 separator and recovery tank 80 removably sets atop base assembly 64 and is  
surrounded by a hood portion 82. Referring to FIG. 2, the base assembly 64

includes a frame assembly 83 which comprises a generally unitary molded rear body 84 having two laterally displaced wheels 66 (the left wheel 66L being shown in FIG. 1) rotatably attached to the rear of the rear body 84 via axles 67.

Integrally molded into the bottom of the rear body 84 is a circular stepped basin 86 receiving therein a motor/fan assembly 90 used to provide the suction power. The motor/fan assembly 90 is in fluid communication with the recovery tank 80. A suitable motor/fan assembly is shown in U.S. patent 5,500,977, the disclosure of which is incorporated by reference.

The base assembly 64 includes a brush assembly 70 having a plurality of rotating scrub brushes 72 (FIG. 3) for scrubbing the surface. An air driven turbine 98 providing motive power for the brush assembly 70 is mounted on the front portion of the rear body 84. The brush assembly 70 is contained in a brush cavity 73 formed in the underside of the front body 92. A suitable brush assembly 70 is taught in patent 5,867,857; the disclosure which is incorporated herein by reference. Brush assembly 70 is operated by a suitable gear train (or other known means), not shown, contained in transmission housing 100. A suitable air turbine driven gear train is taught in U.S. Pat. No. 5,443,362; the disclosure of which is incorporated by reference. The brushes 72 include a plurality of bristles 201 (FIG. 3) arranged in bundles that are compressively inserted into blind bores of the scrub brushes 72.

As depicted in FIG. 4, each bristle 201 is composed of an antimicrobial additive or material 203, made by AgION Technologies, L.L.C., that suppresses the growth of various kinds of bacteria, mold and fungus. In particular, the material contains an inorganic substance having silver 205 in its ionic form. The antimicrobial material includes a zeolite carrier, or delivery system that allows a controlled and effective release of the silver ions 205.

Specifically, the moisture film 207 on the bristle 201 causes a controlled release of the silver ions 205 at a slow and steady rate to provide efficacy against bacteria 209. The silver ions 205 appear to be effective against microbes in preventing cellular respiration, preventing cell replications, and causing cell wall  
5 destruction. This antimicrobial material 203 can endure temperatures of up to 800 degrees Celsius and pH values between 3 and 10, while retaining full antimicrobial effectiveness even during aggressive processing techniques.

Turning back to FIGS. 1 and 2, a floor suction nozzle assembly 124 is removably mounted to the hood portion 82 of the base assembly 64. In  
10 particular, the floor suction nozzle assembly 124 includes a front plate 126 secured to a rear plate 128 that in combination define dual side ducts 130, 132 separated by a tear drop shaped opening 134 as best depicted in FIG. 2. The opening 134 extends down from an accessory hose opening 136, formed in the front portion 126, to a predetermined distance above the suction inlet 138 of the  
15 suction nozzle 124. A door 168 is pivotally connected to the front portion 126 and releasably fits into the complimentary recess 167 to cover the opening 136 when the carpet extractor 60 is used to clean the floor.

The front and rear plates or portions 126, 128 are secured to one another by ultrasonic welding and screw fasteners, however, other types of  
20 ways to secure them such as for example, by adhesive, can be used. The distance above the suction inlet 138 for the opening 134 is about one fourth of an inch, which provides a flow path for liquid and dirt pick up in the center of the suction inlet 138 of the nozzle 124. The side ducts 130, 132 converge upstream into a recessed throat portion 149 (FIG. 1), which terminates into an  
25 upwardly extending rear duct 150. The rear duct 150 is positioned in a complementary recess portion 152 formed in the front lower portion of the

recovery tank 80. The duct 150 fluidly connects with the recovery tank 80.

As depicted in FIG. 2, the recovery tank 80 sets down over and surrounds a portion of the motor cover 230 of base frame assembly 64. It is preferred that recovery tank 80 set atop and surround a portion of the motor fan assembly 90 thereby providing sound insulating properties and assisting in noise reduction of the extractor. The recovery tank lid assembly 301 incorporates therein the air/fluid separator. The motor/fan assembly 90 extracts the air and soiled liquid from the carpet and draws it through the suction nozzle 124 and side suction ducts 130, 132 to the lid assembly 301 of the recovery tank 80 where separation of the air and liquid occurs. A u-shaped carrying handle 332 is pivotally connected to the upper portion of the recovery tank 80.

The supply tank assembly 76 comprises a clean water supply tank 620 and a detergent supply tank 622 with cap 720 (FIG.3) adhesively mounted to the clean water supply tank 620 as depicted in FIG 1. The supply tank assembly 76 includes a combination carrying handle and tank securement latch 78 providing a convenient means for carrying the tank and/or securing the tank to the extractor handle assembly 62. The supply tank assembly 76 is positioned upon a bottom base 624, which with the tank assembly 76 is removably mounted to the handle.

Placed within the clean water tank 620 on the bottom wall is a solid thin cylindrically shaped tablet 211 composed of a fragrance emitting material. In particular, the tablet 211 is composed of the fragrance emitting material, sodium bicarbonate, and citric acid. However, other bicarbonates or acids could also be used. Optionally, cornstarch could be added also. This formulation also provides an effervescent action when water is added to the clean water tank 620, which dissolves the tablet 211. Each tablet 211 further contains a

water softening conditioner to treat one gallon of hard water. Each tablet 211 typically weighs between 6 and 8 grams and produces a pH in the range of 6 to 8 when dissolved in one gallon of water. However, the weight and pH could be other values if desired. The fragrance emitting material can contain one of several fragrances or popular aromatherapy oils such as, for example, jasmine, lavender or vanilla odor. Such a design produces the desired fragrance aroma in the area where the extractor cleans, after the cleaning solution with the dissolved fragrance tablet 211 is distributed on the cleaning surface 74. If a stronger odor is desired, an additional tablet is placed in the clean water tank 620.

To apply the cleaning solution with the above-mentioned formulation, the supply tank assembly 76 is first removed from the handle 62 and the tablet 211 is placed within the clean water tank 620 on the bottom wall. The detergent tank 622 is filled with detergent and the clean water tank 620 is filled with hot water, which dissolves the tablet 211 and produces an effervescent action. The supply tank assembly 76 is mounted back on the handle 62. After the tablet 211 completely dissolves, which takes about .5 to 2 minutes, the carpet extractor 60 is turned on to distribute the cleaning solution on the cleaning surface 74 and then to recover the cleaning solution and dirt from the cleaning surface 74. Alternatively, the tablet 211 could be placed in the detergent tank 622 instead of the clean water tank 620.

FIG. 3 illustrates the overall solution distribution system, which will be described below. The carpet extractor 60 includes a solution hose 794 that fluidly connects the outlet of the clean water tank 620 to a shut off valve 800 used for selectively turning on and off the flow of clean water containing the dissolved fragrance tablet 211. Another solution hose 790 fluidly connects the

outlet of the water tank 620 to an inlet 812 of a pressure actuated shut off valve 804. The outlet of the detergent tank 622 is fluidly connected to an inlet 523 of a mixing Tee 796 via a suitable flexible hose 798.

5 The pressure actuated shut off valve 804 is fluidly connected between the clean water tank 620 and the mixing valve 796 for turning off and on the flow of water. This shut off valve 804 is opened and closed by outside pressure via a conduit 806 connected between it and the outlet 807 of a pump 808 through a Tee 817. The valve 804 includes a pressure port 822 fluidly connected to the outlet 807 of a pump 808. The outlet of the valve 814 is fluidly  
10 connected to an inlet 521 of the mixing valve 796 via hose 815. It should be known that clean water tank 620 could be fluidly connect to the outlet 814 of the valve 804 with the inlet 812 of the valve 804 being fluidly connect to the mixing Tee 796 so that fluid could flow the opposite direction if desired.

In operation, when the pressure at the pressure port 822 is below a  
15 predetermined value such as between 7 to 10 psi, the valve 804 opens to allow water to flow in both directions. Such a pressure value at the pressure port 822 occurs when the main shut off valve 820 is opened and the pump 808 is turned on. The pump 808 also pressurizes the water containing the dissolved fragrance tablet mixed with detergent to draw it to the distributor 792. When the  
20 pressure exceeds a second predetermined value such as between 20 to 30 psi, the valve 804 closes. This would occur if the main shut off valve 820 is closed and the pump is turned on. Thus, with the valve 804 closed, the cleaning solution is prevented from flowing through it. Various types of pumps can be used such as a piston pump, gear pump or centrifugal pump.

25 Outlet 525 of the mixing Tee 796 is fluidly connected via flexible hose 823 to the inlet of the pump 808, which provides pressure to draw the



cleaning solution to the distributor 792, when it is turned on. A relief valve 809 is fluidly connected across the pump 808 to limit the pressure at the outlet 807 of the pump 808 to a predetermine value. The outlet 807 of the pump 808 is fluidly connected to the main shut off valve 820 via flexible hoses 825, 874 and 876. Both of the shut off valves 800, 820 are in the form of a solenoid valve, however, other electrical actuated valves could be also used.

The valves 800, 820 are operated by a trigger switch 821 as depicted in FIG. 1. The trigger switch 821 is pivotally connected to the upper handle portion 358 approximately near a closed looped handgrip 824. Slide switch 858 is used to select one of the shut off valve 800, 822 to be opened and closed by the trigger switch 821. Slide switch 856 is the main power switch, which turns on and off the suction motor 90 and pump 808. The cleaning solution containing the water and dissolved fragrance tablet 211 or the detergent mixed with it flows to their associated shut off valves 800, 820. The cleaning liquid distributor 792 evenly distributes the cleaning solution to each of the rotary scrub brushes 72. The scrub brushes 72 then spread the cleaning solution onto the carpet (or bare floor), scrub the cleaning liquid into the carpet and dislodge embedded soil. A solution discharge valve 877 allows the mixed detergent and clean water containing the dissolved fragrance tablet to flow through an integrally formed nipple 218 and a detachable solution tube 216 to a hand-held cleaning attachment (not shown) and dispense by typical spray means.

As is commonly known, a user pivots the handle 62 in an incline position while moving the carpet extractor 60 over the surface to clean it. The carpet extractor 60 distributes the cleaning solution containing the dissolved fragrance tablet 211 to the carpeted surface using the brushes 72 and

substantially simultaneously extracts it along with the dirt on the carpet in a continuous operation. In particular, soiled cleaning solution is extracted from the carpet by the suction nozzle 124 and transported into the recovery tank 80 where the liquid and air are separated. A vacuum is created in the recovery  
5 tank 80 by the suction motor 90, which draws air from the recovery tank 80 and exhausts the air to the carpeted surface 74. Further details of the above mentioned elements of the carpet extractor are disclosed in co pending application having serial no. 10/165,731; the disclosure being incorporated herein by reference.

10 Alternatively, the tablet could be placed in cleaning machine that has one solution tank such as that disclosed by previously mentioned U.S. patent number 5,500,977. The present invention has been described by way of example using the illustrated embodiments. Upon reviewing the detailed description and the appended drawings, various modifications and variations of  
15 the embodiments will become apparent to one of ordinary skill in the art. All such obvious modifications and variations are intended to be included in the scope of the present invention and of the claims appended hereto.

In view of the above, it is intended that the present invention not be limited by the preceding disclosure of the embodiments, but rather be limited  
20 only by the appended claims.